ABSTRACT

A new start-up operation of a continuous caster is monitored by comparing itself with the normal start-up operation, which is benchmarked by a multivariate statistical model using selected historical operation data. If the new operation is statistically different from the benchmark, then alarms are generated to indicate an impending start cast breakout and at the same time, the process variables that lead to process excursions from the normal operation are identified as the most likely root causes of the predicted breakout. The model is built using Mult-way Principal Component Analysis technology to characterize the operation-to-operation variance in a reduced dimensional space (also known as latent variable space) based on a large number of process trajectories from past normal start-up operations. The process trajectories over the entire start cast duration are predicted based on the current observations. They are then synchronized by interpolating themselves based on pre-specified non-uniform synchronization scales in the strand length such that all trajectories can be aligned with respect to the strand length for further use in model development.